# Orchard Commodity Survey – 2018

**Project Leader** – Juliet Carroll, NYS IPM Program

**Project Collaborators** – Art Agnello, Department of Entomology; Marc Fuchs, Plant Pathology and Plant-Microbe Biology

## *Introduction*

An Orchard Commodity Cooperative Agricultural Pest Survey was conducted for exotic insects and diseases including summer fruit tortrix (SFT), variegated golden tortrix (VGT), velvet longhorned beetle (VLB), spotted lanternfly (SLF), apple proliferation phytoplasma (APP) and latent apple viruses. All the agricultural pests in the survey pose significant threats to NY fruit industries.

## *Objectives*

1. Monitor and scout for the target species in apple and cherry orchards throughout the growing season of 2018 and submit suspect samples for determination.

## *Methods & Results*

We adjusted the USDA APHIS written protocols for NY orchard and growing season conditions. We set up survey sites with growers and monitored for the insects and diseases listed in Table 1, all of which are exotic pests not found in the Northeastern US, except for the latent apple viruses.

**Table 1.** The insects and diseases in the survey included those listed below with the number of farms surveyed by each collaborator shown.

| Target species | | | Number of Farms | |
|---|---|---|---|---|
| **Insect or Disease** | **Abbr.** | **Scientific name** | **IPM** | **Entom.** |
| summer fruit tortrix | SFT | *Adoxophyes orana* | 10 | 5 |
| variegated golden tortrix | VGT | *Archips xylosteanus* | 10 | 5 |
| velvet longhorned beetle | VLB | *Trichoferus campestris* | 10 | 5 |
| spotted lanternfly | SLF | *Lycorma delicatula* | 15 | 0 |
| apple proliferation phytoplasma | APP | *Candidatus* Phytoplasma mali | 15 | 0 |
| latent apple viruses | | | 10 | 0 |
| apple stem pitting virus | ASPV | | | |
| apple stem grooving virus | ASGV | | | |
| apple mosaic virus | ApMV | | | |
| apple chlorotic leaf spot virus | ACLSV | | | |
| tomato ringspot virus | ToRSV | | | |
| tobacco ringspot virus | TRSV | | | |

*Summer fruit tortrix, variegated golden tortrix, and velvet longhorned beetle:*

Two traps per insect species (SFT, VGT, VLB) were used at each farm site; paper delta traps for SFT and VGT, and panel traps for VLB. Farms were located in the following counties: Cayuga, Niagara, Onondaga, Ontario, Orleans, Schuyler, Seneca, Tompkins, Wayne, and Yates. Traps were set out in May in mainly apple orchards, but also in cherry orchards or in hedgerows, depending on the orchard and species, and serviced every one to two weeks until late September.

Lures were replaced at the specified intervals in the USDA APHIS protocols. A total of 90 traps were monitored, evenly divided among the three insect species (CBT, VGT, and ECFF), and serviced seven to 11 times during the season.

Suspect insect specimens were brought back to our labs for pre-screening. A total of 2237 non-target insects were caught in the traps. A subset of these, which couldn't be ruled out as target species, were sent in for determination. Pre-screened suspect specimens of SFT, VGT, or VLB were sent to Jason Dombroskie, Dept. of Entomology, Cornell University for determinations.

*Spotted lanternfly and Ailanthus altissima:*

The 15 orchard locations scouted for APP were also checked for the presence of *Ailanthus altissima*, tree of heaven, a favored host for spotted lanternfly. We surveyed the entire perimeter of orchard blocks and farms to look for its preferred host, tree of heaven. This tree was found at only two of the orchard survey sites. One location in Macedon, NY, Wayne County (GPS coordinates 43.16444 north and 77.3347 south) had six trees in a cluster near an old stone pile. The other location in Sodus, NY, Wayne County (GPS coordinates 43.28394 north and 77.11348 south) had one male tree. To assist with the threat of invasion this insect poses, we also surveyed for Ailanthus along the roadsides we traveled.

*Apple proliferation phytoplasma:*

We scouted for APP in late September. Before scouting we asked for input from the growers in case odd symptoms had been noted on their farms. Apple trees were examined for APP by walking between rows and stopping ten times, every 60 ft., to inspect trees in each row for characteristic disease symptoms. Surveys were conducted in the 15 orchard locations and a total of 1480 trees were examined for APP symptoms. No suspect symptoms were observed and no samples were collected for analysis.

*Latent apple viruses:*

For the apple virus survey orchards were selected that had trees on the following rootstocks G16, Nic29, M9, and G935. Quadrat sampling was done wherein six leaves were collected from four contiguous trees in the row, five quadrats were collected in each row, and every fifth row was sampled in the block. Leaf samples were collected in August and September from ten orchards that had trees on these rootstocks. Apple tissue samples were analyzed for viruses by Fuchs' lab using enzyme-linked immunosorbent assays (ELISA). Only apple stem pitting virus was confirmed in the quadrat samples and no correlation with rootstock type was found (Table 1), though scion did appear to have an effect on prevalence of ASPV (Table 2).

**Table 1**. Number of quadrats (n) testing positive for apple stem pitting virus (ASPV) in leaf samples collected from trees on each of the four rootstocks.

| Rootstock | Proportion with ASPV | n | n ASPV |
|---|---|---|---|
| G16 | 0.20 | 65 | 13 |
| Nic29 | 0.07 | 30 | 2 |
| M9 | 0.25 | 110 | 27 |
| G935 | 0.11 | 18 | 2 |
| **Total** | **0.20** | **223** | **44** |

**Table 2**. Number of quadrats (n) testing positive for apple stem pitting virus (ASPV) in leaf samples collected from different cultivars.

| Cultivar | Proportion with ASPV | n | n ASPV |
|---|---|---|---|
| Gala | 0.13 | 40 | 5 |
| Cortland | 0.00 | 5 | 0 |
| Empire | 0.34 | 65 | 22 |
| Ginger Gold | 0.50 | 10 | 5 |
| Honeycrisp | 0.02 | 50 | 1 |
| Ida Red | 0.40 | 5 | 2 |
| Kingston Black | 0.00 | 3 | 0 |
| Linda Mac | 0.00 | 20 | 0 |
| Ruby Mac | 0.35 | 20 | 7 |
| SnapDragon | 0.40 | 5 | 2 |
| **Total** | **0.20** | **223** | **44** |

*Data submission:*

The orchard commodity survey trapping data spreadsheets were submitted to the NYS Department of Agriculture and Markets (NYSDAM). Tess Grasswitz, Lake Ontario Fruit Program, Cornell Cooperative Extension, also participated in the project and submitted her data and report to the NYSDAM. No invasive or quarantine-level pests, SFT, VGT, VLB, spotted lanternfly or APP, were found by Carroll or Agnello in 2018.

***Conclusions***

The threat of introduction of invasive species of quarantine-level importance is continuous. In 2017 and 2018, two additional insects have been found in New York State.

(1) European cherry fruit fly, *Rhagoletis cerasi*, in Niagara County where a quarantine effort is underway, though only one insect has been found in an orchard almost 5000 have been found in locations concentrated along the Niagara River, likely associated with invasive honeysuckle, *Lonicera tatarica* and *L. morrowii.*
(2) Spotted lanternfly has been found, as of 26 November 2018, in eight NY Counties: Albany, Chemung, Delaware, Kings (Brooklyn), Monroe, New York (Manhattan), Suffolk, and Yates. To date no infestations have developed or been found associated with these incidents.

The threat to the health and longevity of an orchard from latent apple viruses and the nepoviruses (tobacco ringspot virus and tomato ringspot virus) must not be underestimated. Apple decline has become significant in high density orchard systems in recent years. Latent viruses and a newly described luteovirus have been implicated. This survey explored the prevalence of latent viruses in trees on four rootstocks, to determine if any of those was disproportionately contributing to a prevalence of latent viruses in apple trees in high density systems. Only one latent virus was detected and it was not prevalent in any particular rootstock or rootstocks.

***Products - Fact Sheets***

As part of Carroll's work on the commodity survey projects (small fruit, orchard, grape), her program prepares fact sheets on the pests in the surveys. These fact sheets are in Cornell University's digital repository, eCommons. In 2019, we will finalize one on velvet longhorned beetle. The spotted lanternfly fact sheet has been used by NYS DEC and the SLF Incident Command System to support the spotted lanternfly surveillance efforts in 2018. An index to these fact sheets is available on the NYS IPM Program web page,

https://nysipm.cornell.edu/agriculture/fruits/invasive-species-exotic-pests. These fact sheets are written for a lay audience.